and adjoining side, shows where a considerable piece, weighing perhaps two pounds, was broken off, antecedent to its burial, probably at the time it fell. Two of the projections on one side are flattened, as if by pounding, but closer examination shows fine striæ running evenly across both surfaces, which are in the same plain and partly join each other, suggesting that the meteorite in falling may have glanced on a rock, making a slickensided surface. The meteorite also shows two marks made by a sharp tool, like an ax, which also apparently antedate its last burial in the sand. But the most marked feature about this iron is the presence, on the surface, in a number of places, of bright unaltered triolites with a part of a crystal face showing in one place. This feature, in connection with the general freshness of the iron and the presence of what seems to be the original surface over a good part of it, indicates that it is a comparatively recent fall.

Williamstown Meteorite.—I secured this siderite last March from Mr. A. E. Ashcraft, who found it April 25, 1892, on his farm in Grant County, Ky., three miles north of Williamstown. It is a nearly square, thin, flat-shaped iron about $16 \times 12 \times 2\frac{1}{2}$ inches thick in the center, thinning to a blunt edge at either end. It was entire when it reached me, with the exception of a few ounces broken from one edge, and weighed 68 pounds (30.85 kilo.) and has a specific gravity of 8.1. It has already been cut into a number of sections, which etch very readily, showing the structure to be that of a Mediam octohedrite. Three distinct systems of Kamacite lands are cut at approximately right angles, while a third is cut at an angle of 60° or 70°, thus showing an apparent breadth of about three times that of the other lands. Triolite seems to be pretty generally distributed throughout the mass in very small grains, although two nodules about one half inch in diameter were revealed, but the total amount of this mineral is small, as might have been inferred from the general smoothness of the surface, and the specific gravity.

A fuller description of both of these meteorites will be given when the analysis, which will be made at the National Museum, is completed.

Edwin E. Howell

Washington, D. C.,
September 17, 1907

Dr. Armsby's New Unit for Energy

In a paper read before the Society for the Promotion of Agricultural Science[1] Dr. Armsby suggests a new unit for energy. This unit is a million gram-calories and he calls it a *Therm*—spelled with a capital *T*. Since the word *therm* has been suggested and occasionally used to mean the gram-calorie, and since we are accustomed to use the prefixes *kilo* and *mega* to denote, respectively, a thousand and a million—as in kilometer, kilogram, kilowatt, megadyne, megohm—would it not conform better to our customary nomenclature to call the kilogram-calorie a *kilocalorie* and a thousand kilogram-calories a *megacalorie?* These names have the advantage that they would at once be understood by a man who had never seen them before, whereas the name *Therm* would for a time need explanation.

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Special Articles

Some Life-History Notes on Megarhinus Septentrionalis[2] D. and K.

Some observations upon the life history of this rather rare and beautiful species of mosquito were made at this station[3] during the past season.

On September 10, 1906, the senior author collected 24 larvæ of this species and several of a smaller species, probably *Culex pipiens,* from a half-barrel tub of rain water, not more than 100 feet from an inhabited dwelling, on a farm near Church Hill, Tenn. All were placed in a small pail together and carried overland twenty-three miles in a buggy and then forty on the train to this laboratory,

[1] Science, Vol. XXVI., p. 670.

[2] Smithsonian Miscellaneous Collections, Vol. 48, Part 3, No. 1657.

[3] Tennessee Agricultural Experiment Station, Knoxville.

where they arrived September 14. When examined the next morning but two of the larvæ and one pupa of the smaller species remained, the others having been devoured by their larger predatory companions.

The *Megarhinus* larvæ, which had just passed through the last molt (September 10–11, 1906), were placed in beakers containing tap-water, allowing several individuals to each beaker, and kept in the laboratory. They were fed on the larvæ of smaller species, chiefly *Stegomyia fasciata* and *Culex* sp., until October 10, after which time we were unable to secure a further supply of these out of doors.

When feeding upon the smaller larvæ the *Megarhinus* larvæ swallow their prey bodily, but when practising cannibalism, as was observed in two cases, the victim is held in the strong mandibles and slowly devoured. So far as observed these larvæ make no apparent effort to pursue their prey, but remain quietly near the bottom of the water until a smaller larva approaches, when with a quick movement the latter is seized in the powerful mandibles and speedily disappears. In the several instances observed no effort was made to change the hold, whether the prey was first seized near the head, middle or tail. One larva was seen to seize a nearly mature larva of *Culex salinarius* near the middle, and without loosening its hold to swallow it gradually, the head and tail disappearing together. Considerable difficulty attends an attempt at swallowing their prey head foremost, as one instance was noted where the usual three or four minutes were stretched to more than an hour before the still struggling victim finally disappeared. The *Megarhinus* larvæ are able to remain entirely submerged for hours at a time, even during comparatively warm weather, which fact probably accounts for their habit of wintering in the larval stage.

Four of the larvæ died before December 10, 1906, and on that date six of the remaining twenty were transferred to an earthen jar containing about three inches of mud, above which was two inches of water. This jar was sunk into the ground almost up to the rim in a wire screen house out of doors and sheltered from the direct rays of the sun. Here these six larvæ remained throughout the winter. The lowest temperature to which they were subjected was + 13° F., on the morning of December 24, 1906. This cold snap continued two days, freezing ice three fourths of an inch in thickness on the water in the jar. On the afternoon of December 26 the ice had thawed around the edges sufficiently to allow it to be lifted out of the jar, when one larva was found with its anal breathing tube frozen fast in the ice. The other larvæ were lying on the surface of the mud in a semi-torpid condition. One of the larvæ died as a result of this freeze, and by March 12 two others were dead. On March 25 one of the remaining outside larvæ pupated, and another on the thirtieth. A drop in temperature to + 30° F. on the morning of April 2 caused the death of the remaining outside larva and one pupa. The other pupa was so weakened by a freeze on April 15, when the mercury fell to + 26° F., that it died two days later.

On December 15 five of the fourteen larvæ kept in the laboratory were transferred to a beaker, in the bottom of which was about two inches of mud, thus duplicating the conditions of the lot kept outside, except as to temperature. No difference in behavior could be noted, except that the larvæ were more active, as would naturally be expected from the higher and more uniform temperature of the steam-heated room.

Of this lot two larvæ transformed to the pupa state, in which condition one died, the other emerging as adult (female) on April 4. The last larva died April 18.

Soon after the mud was placed in the beaker a number of cyclops and other small water animals were observed swimming about. These were still present this spring, although the mosquito larvæ were without food for a period of five months, during which time they continued active, but were never seen to make any attempt to feed upon these smaller forms of water life. Nor did they during this time resort to cannibalism; but when several larvæ of *Culex salinarius* were placed in the beaker on March 12 they were devoured with great

avidity. This interesting observation indicates a narrow food habit for this species.

Of the nine remaining larvæ of the original lot, five were reared to the adult state. The first pupa appeared March 8, the adult emerging five days later. Thus 179 days had elapsed between the date of collection and the date of pupation, during the last 149 of which the larvæ had been without food.

Among the larvæ kept out of doors, which were under nearly natural conditions, the first pupa appeared 196 days after the date of collection and the last 201 days. The latter lived 18 days, but the adult failed to emerge.

This would indicate that under natural conditions one would expect the pupæ to appear during the latter part of March and most of April and the adults during April and possibly May.

The average length of the known larval life of the ten individuals which transformed to the pupa state was 196.5 days. The shortest period was 179 days, and the longest 205 days. How much it would be necessary to add to this in order to arrive at the total larval life is not known; nor do we know the incubation period, as we were unable to secure eggs.

The shortest pupal period was five days, the longest 11 days, and the average 7.3 days. The shortest adult life was one day, the longest 11 days, and the average 6.8 days. It is probable that with natural conditions the adult stage would have been somewhat lengthened, for this species is rather shy and could not be expected to thrive well under close confinement.

From the fact that a few adults were present when the larvæ were collected, September 10, 1906, together with the dates of emergence of those we reared, we are led to believe that there are at least two broods per year at this latitude. These broods probably are not sharply defined, because of the variation in time required to hatch the eggs of those mosquitoes which lay their eggs singly. It is probable that during the latter part of summer all stages may be found together.

H. A. Morgan
E. C. Cotton

DISSOROPHUS—A CORRECTION

In the *American Naturalist* for November, 1895, Professor E. D. Cope described (p. 998) a new form of Paleozoic amphibian, from the Permian of Texas, which he designated by the name of *Dissorophus multicinctus*. He based the new form on a series of "ten consecutive vertebræ and their appendages" and on account of the peculiar carapace referred to it as a "batrachian armadillo." He characterized the new form as follows:

> The neural spines are elevated, and the apex of each sends a transverse branch which extends in an arch on each side to the ribs. These spinous branches touch each other, forming a carapace. Above and corresponding to each of them is a similar dermal osseous element, which extends from side to side without interruption on the median line, forming a dermal layer of transverse bands which correspond to the skeletal carapace beneath it.

In the *Proceedings of the American Philosophical Society* for May 15, 1896, Cope published on Plate X. three figures of the same specimen and gave the name as *D. articulatus* Cope. Again in the *American Naturalist* for November, 1896, under the title of "Permian Land Vertebrates with Carapaces" (p. 936), he gave additional notes on *Dissorophus* and repeats the same figures which were given in the *Proceedings of the American Philosophical Society,* 1896, Plate X., and again gives the name as *Dissorophus articulatus* Cope.

In Hay's "Catalogue of the Fossil Vertebrata of North America," there are given two species of *Dissorophus, D. multicinctus* Cope, and *D. articulatus* Cope, and reference to the *Proceedings of the American Philosophical Society,* 1896, Plate X., is omitted. Broili ("Paleontographica," 1904) follows Hay, evidently, in making out his list of the Stegocephalia of the Permian of Texas, since he also gives the two species of *Dissorophus.*

There can be no doubt that there is but one species of *Dissorophus* and that species is *Dissorophus multicinctus* Cope first described in 1895. That the specimen first described is the same as the one figured on Plate X. of the *Proceedings of the American Philosophical Society,* can not be questioned. Cope